

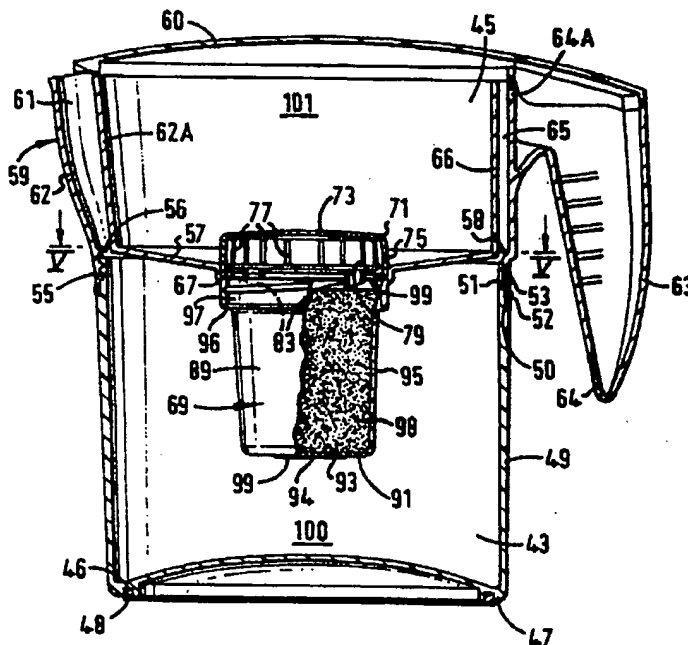


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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**(54) Title:** A WATER FILTER JUG**(57) Abstract**

A water filter jug comprises dividing means (29; 57), wherein the dividing means (29; 57) is adapted to carry water treatment means (41; 69) and is positionable in use so that it divides the jug into an upper compartment (31; 45) and a lower compartment (33; 43). The water filter jug further comprises a spout (17; 61) extending from the jug, the jug having an internal wall portion (14; 62A) extending adjacent the spout (17; 61) to isolate the spout from the upper compartment (31; 45), the internal wall portion (14; 62A) being integrally formed with the jug, whereby a substantially water-tight seal is formed between the jug and the dividing means (29; 57), so that unfiltered water in the upper compartment (31; 45) can only flow into the lower compartment (33; 43) through the water treatment means (41; 69).



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### A WATER FILTER JUG

This invention relates to a water filter jug.

5 Water filter jugs generally comprise a receptacle and a removable hopper, the hopper being supported in or on the receptacle. The hopper defines a water compartment and is adapted to carry a water filter cartridge which typically comprises a moulded container having inlet and  
10 outlet slots formed therein to allow water to enter and exit an internal cavity. Contained in the internal cavity is a water treatment medium which comprises a particulate filter and typically also includes granules of an absorbent material such as activated carbon.

15

In use, the cartridge is located in the hopper so that the inlet slots open into the hopper compartment and the outlet slots open into the receptacle. When unfiltered water is poured into the hopper it flows through the  
20 inlet slots of the cartridge into the container and through the water treatment medium where it is purified. The water then debouches the cartridge into the receptacle through the outlet slots.

25 The problem with this type of water filter jug is that during filling of the hopper compartment with unfiltered

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water, it is easy for water to flow between the sides of the hopper and the receptacle and then into the volume of the receptacle in which the filtered water is collected. Therefore, the efficiency of the water filter cartridge is compromised by the leakage of unfiltered water into the filtered water.

Another problem with water filter jugs which use a hopper is that the hopper itself reduces the useful volume inside the jug. In addition, the hopper itself is unsightly. A yet further problem is that the number of touching surfaces can make such jugs unhygienic and difficult to clean.

According to the present invention there is provided a water filter jug comprising dividing means, wherein the dividing means is adapted to carry water treatment means and is positionable in use so that it divides the jug into an upper compartment and a lower compartment, the water filter jug further comprising a spout extending from the jug, the jug having an internal wall portion extending adjacent to the spout to isolate the spout from the upper compartment, the internal wall portion being integrally formed with the jug, whereby a substantially water-tight seal is formed between the jug and the dividing means, so that filtered water in the upper

compartment can only flow into the lower compartment through the water treatment means.

The dividing means may comprise an insert, the insert  
5 being adapted to be inserted in the jug so that its edge abuts an internal wall thereof and the internal wall portion and forms a substantially watertight seal with the said internal wall and the internal wall portion.

10 Preferably, the insert is substantially planar and has a seal formed around its periphery.

Preferably, locating means are provided on an inside of the jug to locate the insert in an optimum position. The  
15 locating means may be formed as an integral part of the jug. Preferably the locating means comprise elongate ribs.

Preferably, vent means are provided to facilitate  
20 pouring, said vent means being adapted to allow air into the lower compartment during use of the jug.

Preferably a cover is provided which is adapted to be carried on a brim of the jug, thereby to close the upper  
25 compartment.

The receptacle may comprise two interengageable parts, the said dividing means being engageable with one of those parts, so that when the parts are interengaged the dividing means divides the jug into an upper and a lower  
5 compartment. Preferably, the said dividing means is integrally formed with one of said parts, and said one part is adapted to be engaged with said other part so that a water tight seal is formed therebetween.

10 Preferably, the spout has a fluid outlet in fluid communication with the lower compartment when the parts are interengaged, the interengaged parts being interengageable at a mating joint, the mating joint being below the fluid outlet of the spout when the parts are  
15 interengaged.

Water filter jugs in which the aspects of the present invention are embodied will now be described by way of example only and with reference to the following drawings  
20 of which:-

Figure 1 is section through a water filter jug on the line I-I of Figure 2;

Figure 2 is a section on the line II-II of Figure  
25 1;

Figure 3 is a section on the line III-III of Figure 2;

Figure 4 is a section of another water filter jug;

Figure 5 is a section on line V-V of Figure 4;

5 Figure 6 is a scrap section on the line VI-VI of Figure 5.

Figure 1 shows a water filter jug 7 which comprises a receptacle 9 having a base 11 from an outer periphery of which extends an upstanding wall 13. Formed through the wall 13 is an aperture 15 and extending from the periphery of this aperture 15 is a spout 17. Opposite the spout 17 is a hollow handle 19, a section of which opens into the receptacle 9 via another aperture 21. At its upper end the handle 19 has a vent 23 formed therethrough so that air can flow into the handle 19 through the vent 23, then through the aperture 21 and into the interior of the receptacle 9, thereby to facilitate the pouring of water from the receptacle 9 via the spout 17.

20

On an internal surface of the wall 13 are positioned upwardly extending elongate locating ribs 25, see Figures 1, 2 and 3. Typically, each elongate rib 25 is formed as an integral part of the receptacle 9 and has an upper locating ledge 27 from which it tapers towards its lower end, see Figure 3. Carried on the ledges 27 is an insert

29 which divides the receptacle 9 into an upper and a lower compartment 31 and 33 respectively.

The insert 29 comprises an annular disc 35 which typically has a seal 37 made for example of rubber, extending around its outer periphery. Depending from an inner periphery of the annular disc 35 is a fixing arrangement 39 which is adapted to receive a water treatment cartridge 41. The insert 29 is such that in use a watertight seal is formed between it and the portion 14 of the internal surface of the wall 13 adjacent the spout 17 and it isolates the spout 17 from the upper compartment 31. In addition, the fixing arrangement 39 is such that in use unfiltered water poured into the upper compartment 31 has to flow through the water treatment cartridge 41 to access the lower compartment 33. This arrangement is particularly advantageous as it precludes the collection of stagnant water in which algae could develop by forming a watertight seal between the insert 29 and the internal wall 13 and the portion 14 thereof. Typical conventional water filter jugs have a hopper which sits inside the jug but does not form a water-tight seal and thus algae could develop between the outer wall of the hopper and internal wall of the jug.



When in use, a water treatment cartridge 41 is put into the fixing arrangement 39 and unfiltered water is poured into the upper compartment 31 and allowed to filter through the water treatment cartridge 41 into the lower compartment 33. Since the seal between the insert 29 and the receptacle 9 is watertight and the spout 17 is isolated from the upper compartment 31, the efficiency of the water treatment cartridge 41 is not compromised by the leakage of unfiltered water into the lower compartment 33 either during filling of the upper compartment 31, or whilst water is filtering through the water treatment cartridge 41.

Typically, the insert 29 is removable so that the jug 7 can be readily cleaned.

The receptacle 9, the locating ribs 25, the spout 17 and the handle 19 may be formed integrally using for example injection moulding techniques.

20

Advantageously, the receptacle 9 may have a tapered wall so that when a suitably sized insert is fitted thereinto, it jams against the wall, thereby helping to form a good seal. In the case of a removable insert, the use of a tapered wall receptacle also improves the ease with which

a user of the water filter jug can put the insert in place and then remove that insert.

It will be understood that the seal 37 may be omitted,  
5 provided that a suitably watertight seal can be formed between the insert 25 and the internal surface of the wall 13.

Figure 4 shows another water filter jug comprising  
10 interengageable lower and upper parts 43 and 45 respectively. The lower part 43 has a base 47 from the outer periphery of which extends an upstanding wall portion 49. Inserted in an annular recess 46 in the base 47 is a ring 48 which is provided to prevent the jug from  
15 slipping. Towards an upper end of the wall portion 49 and on an external surface thereof, there is an annular shoulder 50 carrying a ring 52 which is provided to form a seal between the lower and upper parts 43 and 45 respectively. Extending upwardly from the annular  
20 shoulder 50 and also on an external surface of the wall 49 is a threaded surface 51. Engaged with the externally threaded surface 51 is an internally threaded surface 53 of a downwardly depending flange 55 which is part of the upper part 45.

Extending upwardly from the flange 55 is an upstanding wall 59 which defines the main volume of the upper part 45. Extending inwardly of the flange 55 is a downwardly depending annular coned base portion 57, see Figures 4, 5 and 6. In opposing sides of the base portion 57 are defined openings 56 and 58, see Figures 4 and 5.

In addition to defining the main volume of the upper part 45, the wall 59 typically forms an external wall 62 of a spout 61. Meeting the external wall 62 at each of its side edges is an internal wall portion 62A which extends upwardly from the edge of the base portion 57 which defines opening 56. Hence, the spout 61 is isolated from the interior of the remainder of the upper part 45 and, when the lower and upper parts 43 and 45 respectively are interengaged as shown in Figure 4, its lower end opens into the lower part 43.

Opposite the spout 61 there is a handle 63 which is hollow and has an aperture 64 formed through its outer surface. Another aperture 64A is provided so that the handle 63 opens into a vent 65 which opens into the space bound by the depending flange 55 through the opening 58. An internal wall portion 66 is integral with the base portion 57 and extends upwardly from the edge of the base portion 57 which defines the opening. The internal wall

portion 66 is spaced from the wall 59 to define the vent 65. Hence, when the lower and upper parts 43 and 45 respectively are interengaged as shown in Figure 4, air contained in the handle 63 can communicate with the interior of the lower part 43 through the vent 65, thereby to facilitate the pouring of water.

Typically, a lid 60 is provided for fitting on an upper extremity of the wall 59.

10

Depending downwardly from an inner periphery of the annular base portion 57 is an internally threaded tubular portion 67 which is adapted to mate with a similarly threaded portion of a water treatment cartridge 69. Covering an upper end of the tubular portion 67 is an outlet member 71.

The outlet member 71 comprises a crown portion 73 from which depends a skirt portion 75, each of which portions 73 and 75 respectively have a series slots 77 formed therethrough, which slots 77 are covered by mesh. At its end remote from the crown portion 75 the skirt portion 73 engages with a piercing member 79 which is carried on a rim on an inner surface of the tubular portion 67. Typically, the outlet member 71 is clip fitted to the piercing member 79 and each of the outlet member 71 and

the piercing member 79 is welded to the tubular portion 67, thereby to form a watertight seal between the outlet member 71 and the annular base portion 57. These features of the water treatment cartridge 69 shown in Figure 4  
5 from the subject of copending International Patent Application No. PCT/GB97/02871.

Depending from the piercing member 79 are hollow piercing stems 83 which extend into the tubular portion 67 and are  
10 provided for piercing a cover 99 on a water treatment cartridge 69.

The water treatment cartridge 69 in this example comprises a receptacle 89 having base portion 91 which  
15 has an opening 93 formed therethrough, which opening is covered by a reticulated screen 94, typically a mesh, see Figure 4. Upstanding from an outer periphery of the base portion 91, is a cylindrical wall portion 95 which forms the main body of the cartridge 69. Around an upper  
20 extremity of the wall 95 extends an outwardly extending rim 96. Extending upwardly from the rim 96 is a generally cylindrical neck portion 97 which is adapted for engagement with the threaded internal surface of the tubular portion 67, thereby to enable connection of the  
25 cartridge 69 thereto. Contained within the cartridge 69 is water treatment medium 98.

The aperture size of mesh in the base 91 of the receptacle 89 is sufficient to allow water to flow therethrough whilst at the same time being smaller than the particles of the water treatment medium 98, so that  
5 in use those particles cannot escape from the receptacle 89 therethrough. Usually an interstitial diameter of about 50 $\mu$ m-300 $\mu$ m is selected, preferably 80 $\mu$ m-200 $\mu$ m.

When the cartridge 69 is being stored before use thereof,  
10 as shown in Figure 5, its upper end and the opening 93 on the base portion 91 are each covered by a cover 99, typically a membrane of for example foil or plastic which is sealed to the receptacle 89 so that during storage moisture is retained within the water treatment medium  
15 98.

The cartridge 69 is adapted to be screwed into the tubular portion 67 so that the membrane 99 at its upper end is broken by the hollow piercing stems 83. When the  
20 cartridge 69 is so screwed into the tubular portion 67 its rim 96 abuts a lower end of the portion 67, so that in use a substantially watertight abutment is formed.

It will be understood that any suitable means of  
25 connecting the cartridge 69 to the base portion 57 could

be used, for example the cartridge 69 could be adapted to be push or snap fitted into position

In use of the water filter jug shown in Figure 4, the lower and upper parts 43 and 45 respectively are initially separate. This allows access to the upper part 45, thereby to enable a water treatment cartridge 69 to be screwed into the tubular portion 67. When the water treatment cartridge 69 is being so screwed onto the portion 67, the hollow piercing stems 83 are caused to pierce the membrane 99 on the upper end of the cartridge 69, thereby to provide an opening through which water can flow into the water treatment medium 98. In addition, the membrane 99 on the lower end of the cartridge 69 is removed to enable water to flow therefrom. The lower and upper parts 43 and 45 are then interengaged by screwing the flange 55 of the upper part 45 into engagement with the externally threaded surface 51 on the lower part 43 until the flange 55 abuts the ring 52 and a seal is formed between the lower and upper parts 43 and 45. When the lower and upper parts 43 and 45 are so interengaged they cooperate to define a receptacle which is divided by the annular base portion 57 into lower and upper compartments 100 and 101 respectively. Unfiltered water is then poured into the upper compartment 101. The coned base portion 57 causes water to flow towards the outlet

member 71, through which member 71 the water flows into the water treatment cartridge 69. Water then flows through the water treatment medium 98 and debouches the cartridge through the mesh 94 and into the lower part 43.

5 Since water can only flow from the upper compartment 101 to the lower compartment 100 through the water treatment cartridge 69, the efficiency of the water treatment cartridge 69 is not compromised by the leakage of unfiltered water into the lower compartment 100 during

10 filling or use of the water filter jug.

The flange 55 of the upper part 45 and the externally threaded surface 51 on the lower part 43 may be adapted so that the upper and lower parts can be screwed into a

15 position ready for use by relative rotation of a single turn.

It will be understood that whilst the lower and upper parts 43 and 45 respectively are interengaged by means

20 of the threaded surfaces 51 and 55 any suitable means for interengaging the two parts can be used provided a suitable seal can be formed therebetween.

An advantage of using the cartridge with the removable

25 cover is that the cost of replacement cartridges is reduced, as each such cartridge need only be provided



with its cover and not additionally a permanent closure or inlet portion. However, whilst a water filter cartridge having a cover which comprises a membrane has been described hereinbefore, it will be understood that  
5 the cover could comprise a replaceable top which can be for example clip fitted onto the cartridge.

The cartridge 69 and/or the upper part 45 and/or the lower part 43 described above may be formed by moulding. The  
10 mesh may be incorporated into cartridge and/or the outlet member during moulding thereof.

The outlet member 67 and the outlet at the base of the cartridge need not be provided with mesh. Alternatively,  
15 or additionally they may each comprise slots or openings which allow water to flow therethrough but substantially prevent particles of the water treatment medium from leaving the cartridge.

20 In addition to a water treatment cartridge with a removable or pierceable cover 99 which is adapted to cooperate with the outlet member 71 in the water filter jug described with reference to Figures 4 to 6, it will be understood that any form of water treatment cartridge  
25 can be used, provided the upper part 45 and/or the lower part 43 is adapted to receive that cartridge. In

particular, a water treatment cartridge and fixing arrangement as described with reference to Figure 1 could be used in the water filter jug shown in Figure 4.

- 5 By having the unfiltered and filtered water compartments completely isolated in use, water filter jugs in which the present invention is embodied avoid the need for a hopper and thereby improve the efficiency of water filtering. In addition, by avoiding the need for a hopper
- 10 the usable volumes of the filtered and unfiltered water compartments are increased. Furthermore, all of these advantages are provided without having to compromise on the aesthetic appeal of the jug.

CLAIMS

1. A water filter jug comprising dividing means, wherein the dividing means is adapted to carry water treatment means  
5 and is positionable in use so that it divides the jug into an upper compartment and a lower compartment, the water filter jug further comprising a spout extending from the jug, the jug having an internal wall portion extending adjacent the spout to isolate the spout from the upper compartment, the  
10 internal wall portion being integrally formed with the jug, whereby a substantially water-tight seal is formed between the jug and the dividing means, so that unfiltered water in the upper compartment can only flow into the lower compartment through the water treatment means.

15

2. A water filter jug according to claim 1, wherein the dividing means comprises an insert, the insert being adapted to be inserted in the jug so that its edge abuts an internal wall thereof and the internal wall portion and forms a  
20 substantially water-tight seal with the internal wall and the internal wall portion.

3. A water filter jug according to claim 2, wherein the insert is substantially planar.

25

4. A water filter jug according to claim 2 or 3, wherein the insert has a seal formed around its periphery.

5. A water filter jug according to claims 2 to 4, further comprising locating means on an inside portion of the jug to locate the insert in an optimum position.

5 6. A water filter jug according to claim 5, wherein the locating means is formed as an integral part of the jug.

7. A water filter jug according to claim 5 or 6, wherein the locating means comprises elongate ribs.

10

8. A water filter jug according to any one of the preceding claims further comprising vent means to facilitate pouring.

9. A water filter jug according to claim 8, wherein the  
15 vent means is adapted to allow air into the lower compartment during use of the jug.

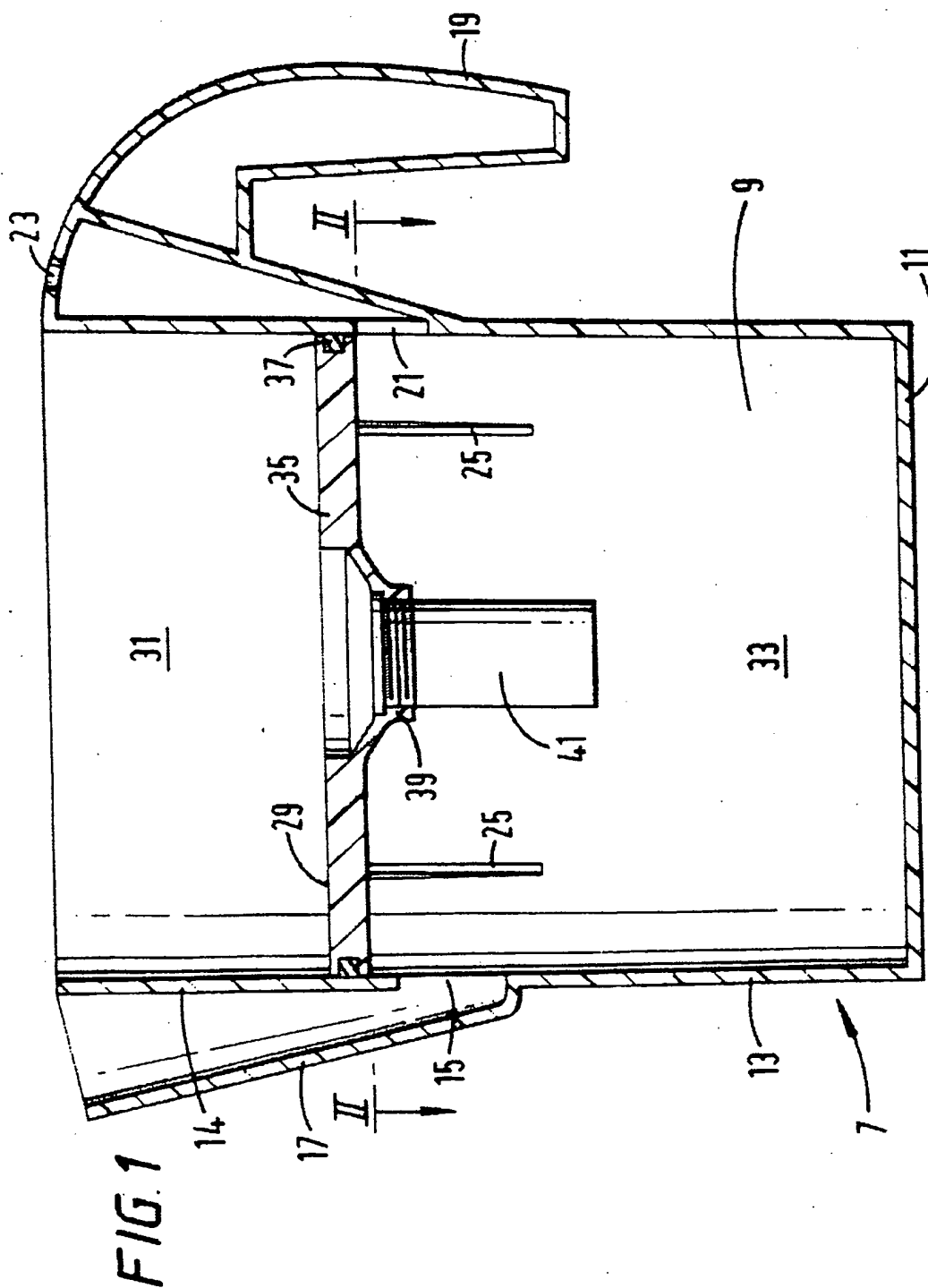
10. A water filter jug according to any one of the preceding claims further comprising a cover adapted to be carried on a  
20 brim of the jug, thereby to close the upper compartment.

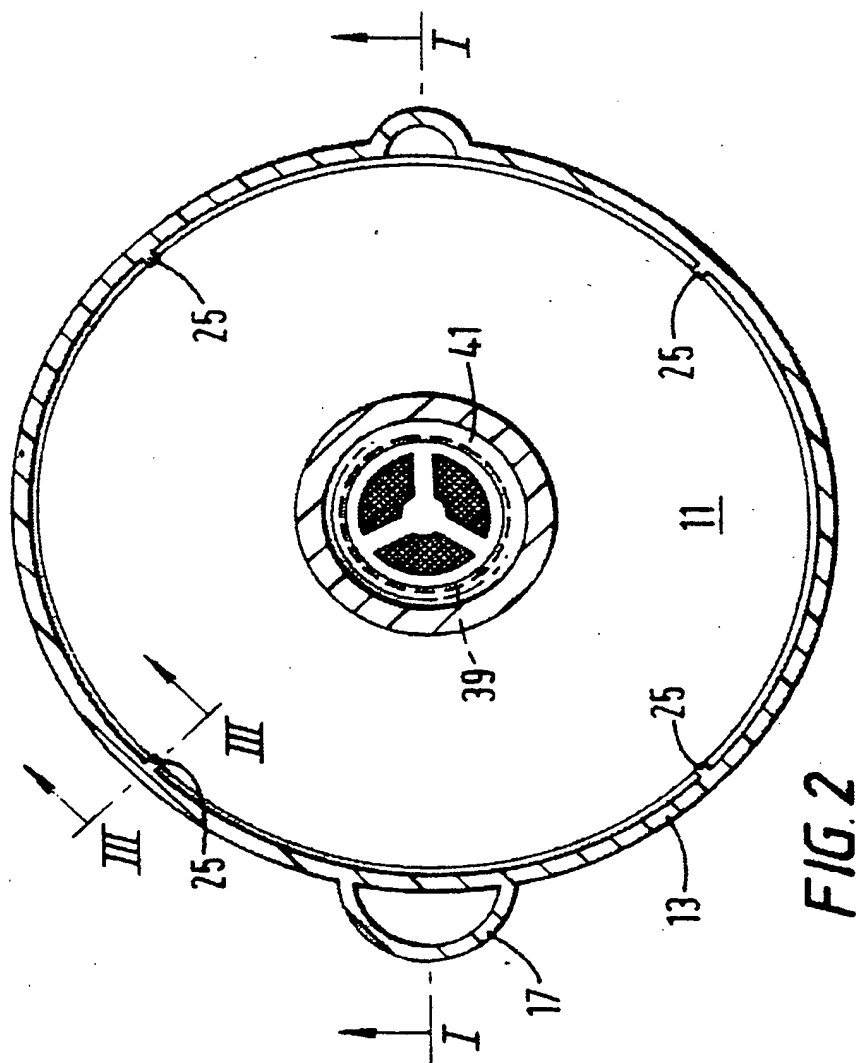
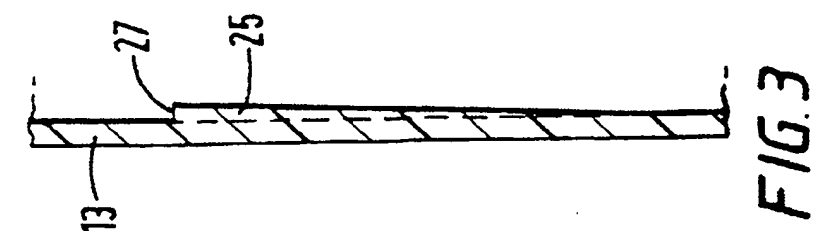
11. A water filter jug according to any one of the preceding claims wherein the jug comprises two interengageable parts, the said dividing means being engagable with one of those  
25 parts, so that when the parts are interengaged the dividing means divides the jug into an upper and a lower compartment.

12. A water filter jug according to claim 11, wherein the dividing means is integrally formed with one of said parts, and said one part is adapted to be engaged with said other part so that a water tight seal is formed therebetween.

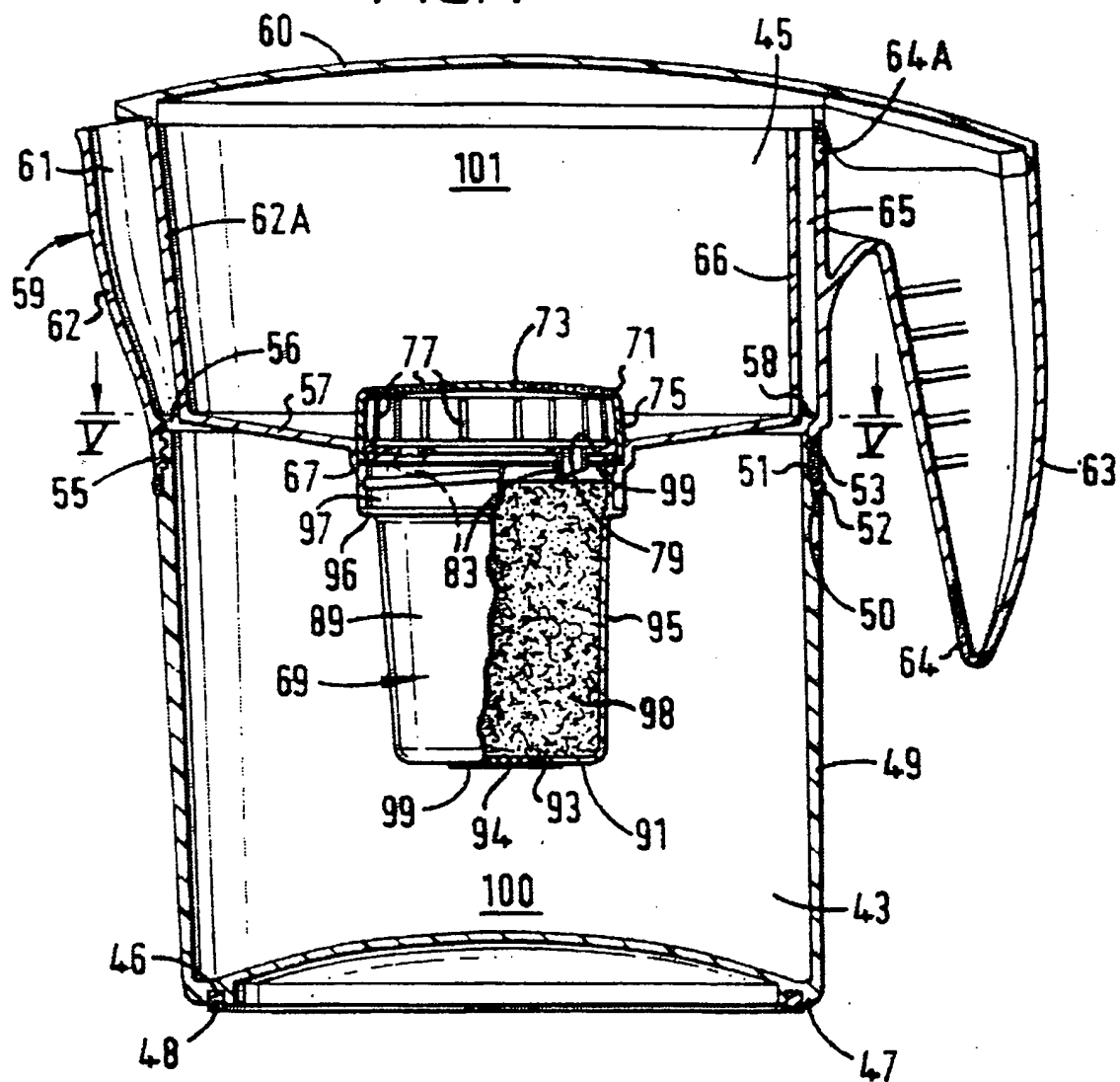
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13. A water filter jug according to any one of claims 11 or 12, wherein the spout has a fluid outlet in fluid communication with the lower compartment when the parts are interengaged, the interengaged parts being interengagable at  
10 a mating joint, the mating joint being below the fluid outlet of the spout when the parts are interengaged.

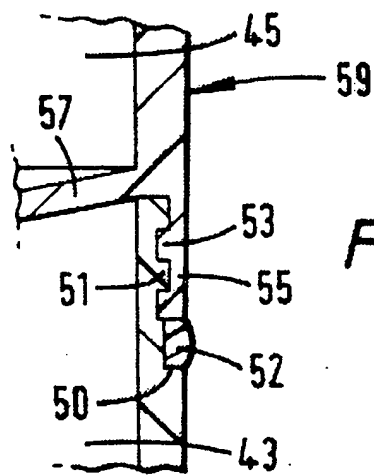
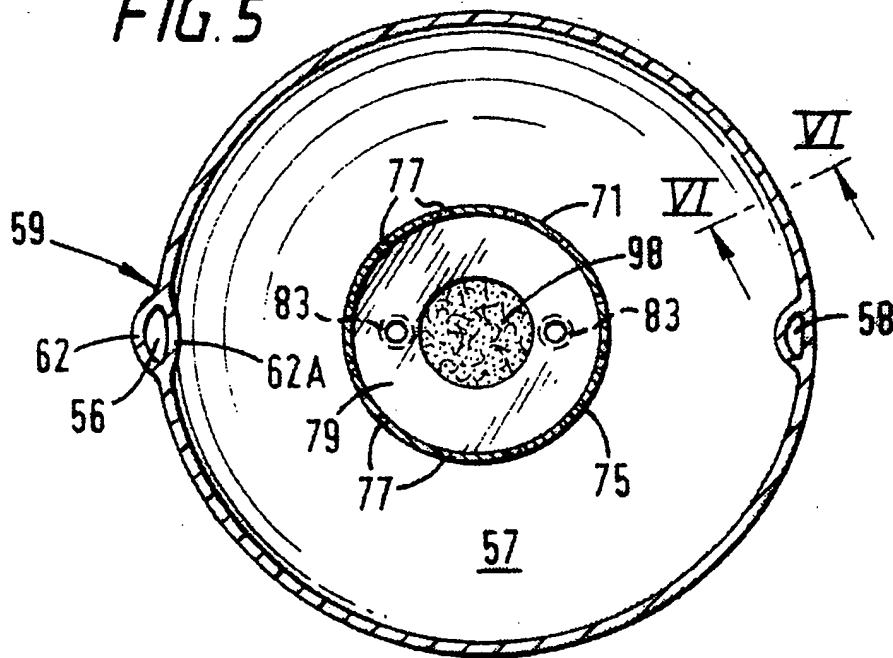




**FIG. 4**





**FIG. 5****FIG. 6**

# INTERNATIONAL SEARCH REPORT

Int. Application No  
PCT/GB 98/00250

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 C02F9/00

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 C02F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 623 457 A (HANKAMMER) 18 November 1986 see column 5, line 24 - column 7, line 40; figures	1-13
A	US 5 076 922 A (DEARE) 31 December 1991 see figure 5	1-13
A	GB 2 197 647 A (PRECISION ENGINEERING CO. LTD.) 25 May 1988 see figure 1	1-13

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 98/00250

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